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TECHNOLOGY DEPT.

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • MAY 13, 1944



Solar Eclipse

See Page 313

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CHEMISTRY

Quinine Synthesized

Exact duplication of malaria remedy achieved for the first time by chemists. May point way to development of better anti-malarial than quinine or atabrin.

► FOR THE FIRST time in history quinine, important malaria remedy found in the bark of the cinchona tree, has been put together in the laboratory.

This total synthesis of quinine has been accomplished by two 27-year-old American chemists, Dr. Robert B. Woodward, of Harvard, and Dr. William E. Doering, of Columbia University, working for the Polaroid Corporation.

Their success in achieving what chemists the world over have attempted for almost 100 years was announced simultaneously with publication of details of the method in the *Journal of the American Chemical Society*. (May)

This chemical feat may point the way to another important achievement, the development of a better anti-malarial than quinine itself or the synthetic chemical, atabrine, now also widely used in malaria treatment. Although both quinine and atabrine are effective in treating malaria, neither of them is a true prophylactic or preventive of a malaria attack. This is because neither attacks the malaria germ in its earliest, pre-infective stage as injected by the mosquito. Nor is either of them very effective in preventing relapses.

The Woodward-Doering process for synthesizing quinine has already led to synthesis of another entirely new substance, an optical isomer of quinine. The structure of this substance looks like the reflection in a mirror of the quinine molecule. Tests to determine whether it has value as a remedy are planned.

The synthesis started with a coal-tar derivative, 7-hydroxyisoquinoline, and proceeded through nearly a score of chemical processes until the scientists had succeeded in creating quinotoxine. This chemical had originally been produced from quinine by Pasteur and in 1918 a German chemist, Rabe, had reconverted it into quinine. When Dr. Woodward and Dr. Doering, had reached the total synthesis of quinotoxine, they knew they could reach their goal by following Rabe's method for converting this chemical into quinine.

Whether the laboratory synthesis can be made commercially practicable has not

yet been determined. The Polaroid Corporation does not intend, states Edwin H. Land, president and director of research, to manufacture the products involved but to license the process, after consultation with government authorities, to such organizations as are best fitted to assure the broadest usefulness for the scientific discovery.

Commercial production of synthetic quinine might be pushed if we did not have enough atabrine and totaquine for military and essential civilian needs. Totaquine is a mixture of chemicals from cinchona bark and contains quinine.

When the Japs seized Java in March, 1942, they also gained almost the entire world's supply of quinine, which for about three-quarters of a century had come from the Dutch cinchona plantations there. At the same time quinine was desperately needed by American and

other United Nations forces fighting in the jungles of the Southwest Pacific and other malaria-ridden regions.

Cinchona trees, however, are native to South America, where the anti-malarial action of their bark was first discovered. Since the war steps have been taken to reestablish these cinchona plantations. Our supplies of totaquine are coming now from Latin America.

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VOLCANOLOGY

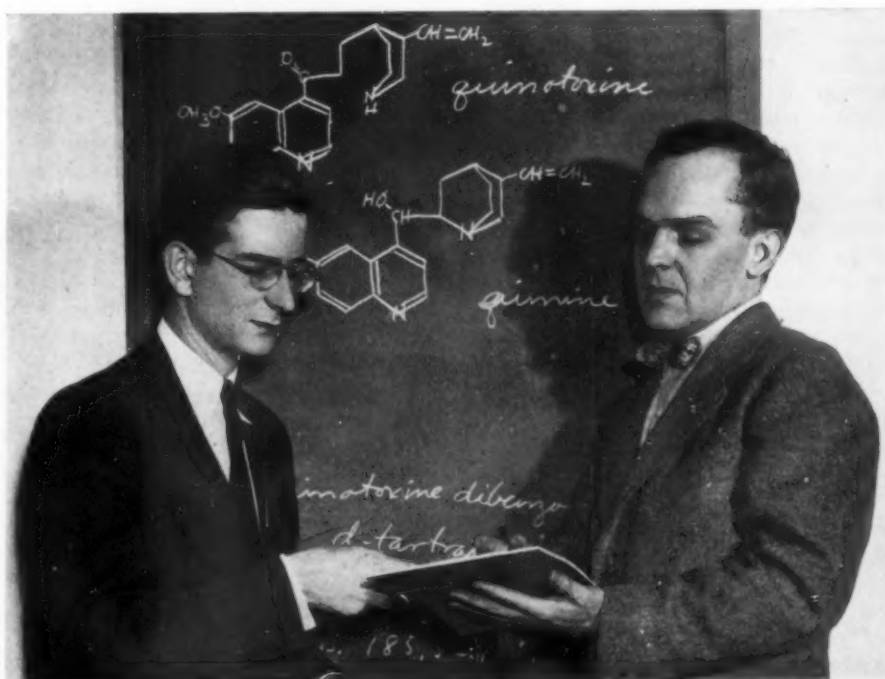
Lava From Paricutin Threatens to Engulf Town

By WATSON DAVIS

Writing From Mexico City

► SLOWLY CREEPING lava from Paricutin volcano is threatening to engulf the town of San Juan Parangaricutiro, nearly five miles away, and to drive 2,500 people from their homes. Engineer Ezequiel Ordóñez, 77-year-old dean of Mexican geology, recently left on his 26th trip to Paricutin, to determine how soon the town must be evacuated.

Moving six feet hourly, the flow has now reached a little valley 120 feet wide



SUCCESSFUL—An exact duplicate of quinine has been synthesized by chemists Robert B. Woodward (left) and William E. Doering, working for the Polaroid Corporation. That very valuable natural drug had defied duplication for nearly a century. But after less than 14 months of work the two young chemists completed the synthesis.

and six feet deep on the outskirts of San Juan. Whether lava engulfs the town is a race between the ability of this valley to hold lava without spilling and the continued outpouring from the volcano. Strangely enough, this new flow comes from the southern side of the volcano, which is the far side from the threatened town. The new stream of liquid and hot rock curves around old flows which engulfed the little village of Paricutin last year.

Eruption of the volcano itself is at present somewhat subdued, probably due to the effort of ejecting lava, but it still erupts every nine to ten seconds.

"Explosions occur very deep within the crater and vapors of explosions issue from the crater's mouth, with noises like

waves breaking against a rocky shore," Senor Ordenez reported in Mexico City, where he was trying to arrange government assistance for the Indian population facing eviction by the flow.

Senor Ordenez and his observers, constantly at the volcano's side day and night, are watching and recording what happens as carefully as they did in the weeks just after the volcano was born out of a cornfield on Feb. 20, 1943—first such event to be witnessed by human beings during recorded history.

Even if the lava fails to invade the town, the countryside for 20 miles around will not grow crops for decades to come and the Indian farmers must eventually be resettled elsewhere.

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MEDICINE

Mold Put Into Body

New kind of penicillin treatment consists of injection of the hyphae themselves. Tests on humans and animals show quick results with no bad reaction.

► A NEW and apparently better way of using penicillin, putting part of the mold itself directly into the body where it goes on producing its anti-germ chemicals, is suggested in a report by Dr. H. E. Enoch and Dr. W. K. S. Wallersteiner, of London, in a report to the scientific journal, *Nature*. (March 25)

No harmful effects resulted in animals or humans from this method of using penicillin, the scientists report. The response to treatment is prompt, usually within three or four hours after the first injection. Fever dropped and there was immediate relief of pain in the trials on laboratory animals.

Results have already been obtained in human cases of pneumonia that failed to respond to sulfa drugs, and in acute staphylococcal, streptococcal and other infections.

In most of the animal cases one or at most two injections of the material were enough to completely clear an infection. Penicillin itself is rapidly eliminated from the body via the kidneys, which has necessitated giving frequent and usually large doses in order to have enough of it in the body to fight the invading germs. It may have to be given as often as every three or four hours. One injection of the living mold material, however, has an effect that appears to last for 36 to 48 hours.

The material used is a suspension in fluid medium of the hyphae, or filaments, of the mold. They are taken from below the mycelium, or mat of mold filaments, on top of the culture at the stage of its highest rate of penicillin production.

The material is freed of fever-inducing substances and other impurities and is equally efficient whether injected into the veins or the muscles. It seemed "exceptionally potent" when used in treating open wounds with mixed, fever-causing infections.

The effects of this material in checking infection, the scientists believe, are due not only to penicillin, which the mold goes on producing in the body, but to the presence or production of other anti-germ chemicals which are destroyed or left behind in penicillin manufacture.

In 21 cases of animal infections, positive results were obtained in 14. There was some doubt about three cases and four others failed to respond. Even when the living mold material was injected directly into the animal's veins, no harm resulted.

The infections which responded to treatment were gastro-intestinal (the colon bacillus), staphylococcal, streptococcal and pneumococcal. Virus infections did not respond to the treatment.

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CHEMISTRY

Anti-Bleeding Vitamin Receives U. S. Patent

► VITAMIN K, the anti-bleeding vitamin, is now covered by U. S. patent 2,348,037, issued to the group of five scientists who first isolated the compound in pure form, determined its chemical structure, and duplicated it synthetically in the laboratory. Rights in the patent have been assigned to St. Louis University, and any proceeds from licenses to manufacture it commercially will be plowed back into scientific investigation. The five-man

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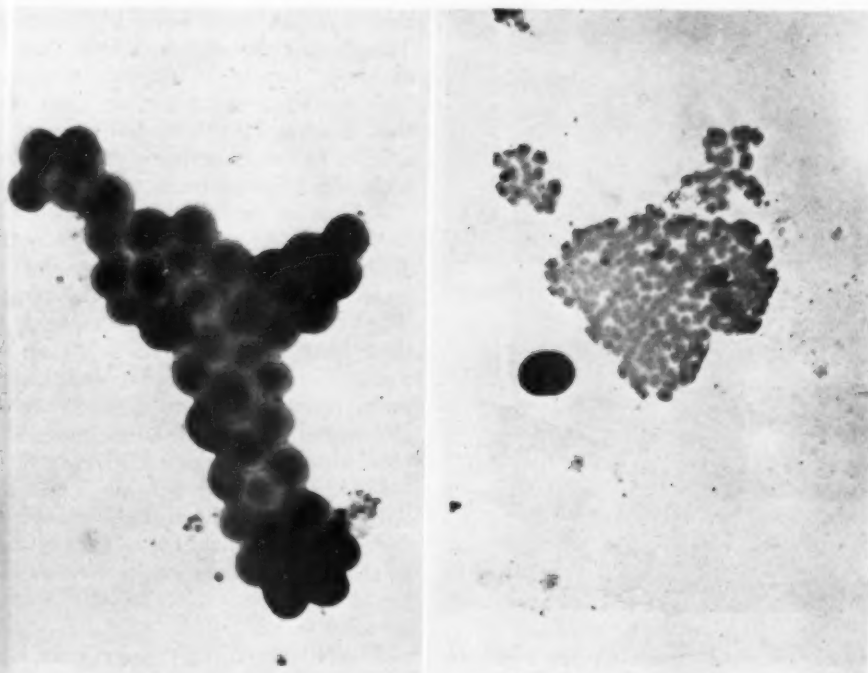
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PENICILLIN IN ACTION—The first photographs to reveal the effect of the mold chemical on disease-causing bacteria, these micrographs show the bacteria *Staphylococcus aureus* magnified about 19,000 times with the electron microscope. The bacteria is shown (left) as a grape-like cluster before penicillin is introduced and (right) after penicillin has affected the germs.

research team who are listed as patentees are Dr. S. A. Thayer, Dr. S. B. Binkley, Dr. R. W. McKee, Dr. D. W. MacCorquodale and Dr. E. A. Doisy, all of the staff of St. Louis University Medical School.

The name "vitamin K" has been used only as a convenience; spelled out in full

chemical longhand the substance is 2-methyl-3-phytyl-1,4-naphthoquinone. It can be obtained from plant substances as a natural source (the inventors mention alfalfa), or it can be made synthetically with coal tar as the original starting point.

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BACTERIOLOGY

Phage Against Dysentery

One ultramicroscopic bacteriophage particle will protect mice against eight virulent dysentery germs. Is unique among germ-eat-germ substances.

► **UNIQUE** among the antibiotic or germ-eat-germ substances, of which penicillin is the present champion, is bacteriophage, Dr. Harry E. Morton, of the University of Pennsylvania School of Medicine, told members of the Society of American Bacteriologists at their New York meeting.

The unique feature of bacteriophage is that as it is used to destroy virulent germs in the body more of the active phage is generated.

One ultramicroscopic phage particle

will protect mice against eight virulent dysentery germs, Dr. Morton and associates, Frank B. Engley, Jr., and Juan Enrique Perez-Otero, found. In one experiment, all mice survived 12,000 minimum deadly doses of dysentery germs when at the same time they were given one cubic centimeter (about a fourth of a teaspoon) containing about 50 billion particles of phage active against these germs.

When used as a treatment for dysentery, the phage had to be given within

a few hours of the infecting dose of germs. When, however, the phage was given one, three, five or six days before, the mice survived about 10,000 minimum killing doses of the germs.

Bacteriophage, discovered many years ago by French scientists, is believed by some to be a living organism or virus that preys on other, larger germs. Other scientists believe it is a non-living substance like an enzyme or ferment. It destroys its germ victims by a process called lysis or dissolution.

The protective action of the phage in the body is related to this lysis which can be observed in the test tube, Dr. Morton and associates reported. Unless there is lysis of the germs in test-tube experiments, there will not be any immediate protective action in the animal body. Test-tube experiments alone, however, are not sufficient for evaluating the effect of the substance in the body, Dr. Morton pointed out. Even the sulfa drugs and penicillin would have been misjudged if they had been evaluated on the basis of test-tube experiments alone.

The conflicting scientific opinions of bacteriophage resulted, apparently, from the fact that early reports were based on test-tube experiments or on inadequately controlled trials in animals. The Pennsylvania experiments were planned to give more adequate knowledge for evaluating bacteriophage which, on the basis of today's report, appears as an effective weapon against dysentery, at least in mice.

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New Micrographs Shown

► **THE FIRST PICTURES** showing penicillin in action against disease germs were shown by Dr. V. K. Zworykin, Dr. James Hillier and Perry C. Smith, of the Radio Corporation of America, at the meeting.

The pictures were made with the electron microscope, which uses a concentrated beam of electrons instead of light and a system of "magnetic lenses" to show objects 100 times smaller than can be seen even with the most powerful optical microscopes.

Staphylococci, life-threatening invaders of war wounds as well as the cause of boils and food poisoning, appeared first as large grapes in the greatly magnified electron microscope pictures. Then they were seen to shrivel under



SUB-MICROSCOPIC EXPLORER—The electron microscope will be available to smaller laboratories, schools, hospitals and factories in this new desk size. Shown in this picture are Dr. V. K. Zworykin (seated left), associate director of the RCA Laboratories, Dr. James Hillier (seated right), young pioneer in electron microscopy, and Perry C. Smith, engineer.

penicillin's action to small wrinkled kernels.

First showing in this country was also given an electron microscope picture of the malaria parasite in the salivary gland of a mosquito at the stage when the next person bitten by the mosquito would get the parasite in his blood.

A slime organism that grows on gasoline along the walls of piping that carries this now precious fuel and causes some trouble was also made visible to the bacteriologists by the electron microscope.

The action of bacteriophage, unique germ-eat-germ substance reported at the meeting as a potent weapon against dysentery, at least in trials on mice, was

seen in another series of electron microscope pictures. One or more phage particles, these pictures showed, become attached to a germ and possibly enter it. There they multiply by a still unknown process. The cell membrane of the germ becomes weakened and destroyed until finally it bursts, throwing out cell contents including about 150 newly formed bacteriophage particles.

An entirely new desk-size electron microscope, smaller, cheaper and easier to operate than the large model, is now in production. This and an improved universal model were introduced at the meeting.

Science News Letter, May 18, 1944

MEDICINE

Rabbit Cancer Antibody

Tumor growth of non-virus origin can be suppressed in animals. At this stage of the work, no human application, such as vaccination against cancer, can be seen.

► **DISCOVERY** of a specific antibody which suppresses the growth of the Brown-Pearce cancer in rabbits is announced by Dr. John K. Kidd, of the Rockefeller Institute for Medical Research. (*Science*, April 28)

No human application, such as vacci-

nation against cancer, can be seen in the work at this stage. In fact, Dr. Kidd stated in an interview that it is "vastly too far away to have any foreseeable effect in human cancer."

The scientific importance of the discovery lies in the fact that the Brown-

Pearce cancer is not caused by a virus. This is probably the first time that an anti-body has been found to suppress such a cancer. Antibodies are substances that develop in the blood in response usually to invasion by a disease germ such as a virus or other microorganism.

Rabbits of the blue-cross breed could be vaccinated, as it were, against the Brown-Pearce cancer by injections of watery, cell-free extracts of the tumor. They developed the specific antibody in their blood after three or four such injections and then proved resistant, generally completely so, to a small dose of Brown-Pearce tumor cells implanted into their muscles a week or 10 days later.

Rabbits that had not developed the antibody did not have this resistance to the cancer. Animals that were resistant to the Brown-Pearce cancer were as susceptible as other rabbits to cells of other types of cancer.

The Brown-Pearce cancer cells have a constituent which has some of the characteristics of a virus, but Dr. Kidd is of the opinion that this cancer is not a virus tumor. Its distinctive constituent, which may be a protein, can be detected in test-tube experiments through its reaction with the antibody that appears in the blood of certain rabbits in whose body the tumor has been implanted.

When the distinctive constituent and blood serum containing the antibody are incubated together for two or three hours and then injected into a rabbit, the animal usually fails to develop a tumor, though it will do so when the distinctive constituent has been incubated with normal rabbit blood serum.

Dr. Kidd is now seeking similar material in other animal tumors. One, he has already found, the V2 carcinoma, yields a distinctive constituent substance that is not detectable in extracts of normal rabbit tissues or in those of other rabbit tumors, including the virus papillomas of the type from which the V2 cancer originally derived.

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ELECTRICAL ENGINEERING

One-Pound Generators Float Weather Balloons

► **ONE-POUND** hydrogen generators now furnish the lifting power needed to float into the sub-stratosphere weather-recording balloons used by the Army Signal Corps to chart the weather accurately.

Inflation of these balloons under difficult conditions at the front lines has

been made possible by an ingeniously contrived device, the hydrogen generator container, designed in the laboratory of the American Can Company's war products division in collaboration with Signal Corps officers.

Adaptable to almost instant use in any field of action where water is available, this generator replaces the former hydrogen tank which, because of its weight and bulk, required trucking.

A companion device to the generator is a new battery can which makes it possible to fill automatically the batteries with acid by packing them in a vacuum, just as foods are packed for safe-keeping. When the can is punctured, acid is drawn by the vacuum into eighteen tiny holes in the battery which is held clear of the sides of the can by fluted partitions.

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AERONAUTICS

New Helicopter Has Stabilizing Device

► A NEW HELICOPTER, which incorporates important principles for stability and for precision control, has just been announced by the Bell Aircraft Corporation, where the stability principle was developed and the new flying machine constructed. The company plans to build helicopters for commercial and private flying after the war, but until the war is over the entire production will be for military uses.

The stabilizing device, developed by Arthur M. Young of the Bell Aircraft Corporation, is placed between the mast and the rotor of the helicopter, with the result that the rotor tends to remain in a horizontal plane regardless of the angle with the earth of the fuselage itself. This gives a stability that increases simplicity of controls.

The new Bell machine uses a Franklin air-cooled engine, rated at 160 horsepower, mounted vertically behind the pilot's compartment. It uses a two-bladed rotor with a simplified hub design. The rotor is free-wheeling, as on other helicopters, and when the engine stops the blades run free in autorotation.

Rotor, mast, transmission and engine are mounted integrally, and are set in the fuselage in soft rubber mounts in order to decrease vibration. The span of the rotor is 33 feet. A conventional anti-torque five-foot propeller on the tail is two-bladed, and is made of solid wood, as are the blades of the rotor.

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NUTRITION

One Year at Work Needed

► THE PATIENT who has suffered from pellagra or any other vitamin deficiency disease cannot be considered "cured" until he has been steadily at work for one year, Dr. Tom D. Spies, director of the nutrition clinic, Hillman Hospital, Birmingham, Ala., and associate professor at the University of Cincinnati College of Medicine, declared at the University's 125th anniversary celebration.

When these patients are treated only during a short phase of their disease and discharged and allowed to go back to their old environment as soon as they feel well, they break down again. This, Dr. Spies suggested, may have been the basis of the old saying, "Once a pellagrino, always a pellagrino."

At least 400 persons who were essentially invalids have been rehabilitated at the nutrition clinic to the point where they are now doing full-time work, Dr. Spies reported. Of the 400, 30 are in the armed forces, 82 are in agriculture, 97 in domestic service and 191 in industry.

Synthetic vitamins are often life-saving and are needed for critically ill patients. Eventually, however, patients with deficiencies have to have a suitable diet.

"We not only recommend it but see

that they get it," Dr. Spies stated in emphasizing the follow-up treatment of patients after they have recovered.

There were no deaths among the 16,121 patients who visited the nutrition clinic during the calendar years 1942 and 1943, although at the beginning of the studies there the mortality rate in a series of severe uncomplicated cases was 54%.

Persons with malnutrition have a number of deficiency diseases operating simultaneously, Dr. Spies declared. They recover much faster when all the deficiencies are recognized and treated.

Stressing the importance of early diagnosis, before the severe, textbook symptoms develop, he said that he suspects that these conditions often escape detection.

Most dramatic are the responses to specific nutritional treatment of persons with mental disease as a result of vitamin deficiency. Dr. Spies gave as an example of this the case of a man "who had been incarcerated in a custodial institution for the legally insane for 14 months. We were able to have his mind functioning properly within 72 hours after treatment was begun," he stated.

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POST-WAR FAMILY CAR?—The stability device incorporated in the Bell Aircraft Corporation's helicopter makes it possible for Arthur M. Young, who developed the new machine, to study its operation as it hovers motionless in gusty air.

CHEMISTRY

Lack of B Vitamins Shows Viruses Not Living

► VIRUSES, the causes of many diseases including the common cold and infantile paralysis, are not living organisms like other disease germs but complicated protein chemicals, inanimate in nature, in the opinion of Prof. Roger J. Williams, director of the Biochemical Institute of the University of Texas.

The reason for his opinion is based on findings at the Clayton Foundation, showing that viruses apparently do not contain any B vitamins. Appreciable amounts of the various B vitamins have, however, been found in all forms of living matter which have been investigated, Prof. Williams states in a report to the *Journal of the American Chemical Society*. (May)

The presence or absence of these vitamins, he suggests, may be used as a criterion of the living or non-living nature or origin of a material in question.

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MEDICINE

Sulfaguanidine Effective In Asiatic Cholera

► SULFAGUANIDINE may be the means for conquering "our bitter enemy," Asiatic cholera, Dr. Joo-Se Huang, of the Kwangsi Provincial Medical College, at Kweilin, China, reports. (*Journal, American Medical Association*, May 6)

Only one patient died of the 22 he treated with sulfaguanidine. This is a death rate of less than 5%, whereas the death rate from Asiatic cholera ranges from 20% to 60% in various clinics, with a rate of 26% in the Provincial Hospital of Kweilin during 1943, Dr. Huang reports.

The only other treatment given the patients was lots of water to drink and drugs such as camphor water and tincture of digitalis to stimulate circulation. Within three or four hours after the first dose of sulfaguanidine the patients began to improve and within eight hours no more cholera germs could be found in their discharges. Vomiting and diarrhea had almost ceased and the deadly cyanotic color of their skins and mucous membranes had given way to a healthy bright color.

As the treatment decreased the vomiting and diarrhea within a few hours, the continuous and overabundant loss of

water from the tissues was prevented and the danger of severe dehydration avoided.

The favorable results of sulfaguanidine treatment of bacillary dysentery gave Dr. Huang the idea of trying it in cholera, which is also a disease that attacks the intestinal tract. He was surprised to find the drug effective in the first case treated with it but, he reports, after several experiments he "had to concede that sulfaguanidine could give an unexpected effect in Asiatic cholera and that an effective remedy had been found whereby our bitter enemy cholera, which had been killing a great many people in the world for many years, could eventually be subdued."

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PHYSIOLOGY

Brain Injury Affects Complex Action Control

► HOW INJURY to the frontal cortex of the brain affects control of complicated movements has been shown by studies of dogs and of human patients. Removal of frontal sections of the cortex of dogs, Prof. P. K. Anokhik reported at the tenth physiological conference held in Moscow in memory of the great Russian physiologist, Ivan Pavlov, left secretory and simple motor reactions untouched but showed itself in the fact that it was impossible to stop motion that formed part of a complex action once it had been started. Impossibility of stopping movement and disruption of consecutiveness and different phases of complex actions were shown in a number of patients with injuries to the frontal cortex, as reported by Prof. A. R. Lurye.

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INVENTION

New Flying Boat Hull With Hinged Step Patented

► GIVING flying boat hulls a better shape for moving through the air is one of the objectives of patent 2,347,841, taken out by James F. Parker of Guantanamo Bay, Cuba. The normal under surface of a flying boat has a stepped structure, like a hydroplane, to assist it in lifting itself out of the water. However, the step creates troublesome air drag in flight. Mr. Parker obviates this by hinging the step, so that it can be retracted after the takeoff, making the hull more smoothly streamlined.

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IN SCIENCE

ENGINEERING

Compact Dust Precipitator Suitable for Trains

► AN ELECTRICAL dust precipitator, claimed to be much more compact than other similar apparatus, is the subject of patent 2,347,709, granted to G. W. Penney of Wilkesburg, Pa., and assigned to the Westinghouse Electric & Manufacturing Company. Secret of the compactness is the use of thin, closely spaced plates on which to precipitate the dust particles after they have been given their electrical charges. Suitability for use in railway trains, buses and the like is one outstanding advantage claimed by the inventor.

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CHEMISTRY

Bitter Flavor in Milk May Be Due to Lipase

► A BITTER FLAVOR in sweet milk and cream is sometimes caused by a substance called lipase, present in most milk, under certain conditions, it was reported by B. L. Herrington and V. N. Krukovsky of the Cornell University Agricultural Experiment Station.

By attacking the butterfat globules and breaking them down to produce fatty acids, lipase can cause the milk to take on a flavor that is similar to but not quite as strong as that of rancid butter.

The lipase becomes activated only under conditions favorable to this action, the Cornell scientists explained. For instance, vigorous shaking of raw milk or homogenization, which breaks up the fat globules into small particles, may cause bitterness to develop rapidly. Warming of raw milk to 85 degrees Fahrenheit and then cooling it also brings rapid breakdown of some of the fat, with the resulting bitterness. This often happens in country cream plants unless the milk is heated to 120 degrees Fahrenheit before separation, or unless the cream is pasteurized immediately after separation.

Skim milk never develops the off-flavor, as it contains no fat to be decomposed.

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NE FIELDS

NUTRITION

New Vitamin Discovered Helps Nourish Chicks

► **DISCOVERY** of what appears to be a new vitamin is announced by Dr. B. L. Hutchings, Dr. E. L. R. Stokstad, Dr. N. Bohonos and Dr. N. H. Slobodkin, of Lederle Laboratories. (*Science*, May 5).

The scientists do not give any name to the substance which they report having isolated in crystalline form. It is active in promoting growth of two kinds of microorganisms, *Lactobacillus casei* and *Streptococcus lactis* R. It is also active in the nutrition of the chick. What role, if any, it plays in the nutrition of humans is not stated.

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PUBLIC HEALTH

Vaccine Effective Against Two Types of Influenza

► **INCREASED** resistance to two types of influenza may be achieved by vaccination in future, it appears from reports by Dr. Thomas Francis, Jr., Dr. Jonas E. Salk, Dr. Harold E. Pearson and Dr. Philip N. Brown, of the University of Michigan School of Public Health and the Ypsilanti, Mich., State Hospital, to the Society for Experimental Biology and Medicine.

A vaccine containing concentrated, inactivated influenza virus, Types A and B, was given to a group of men at the Ypsilanti State Hospital in anticipation of an influenza outbreak in late winter and early spring of 1942-1943. When the outbreak failed to develop that winter, the effect of the vaccine was tested by spraying influenza A virus into the noses of one group of vaccinated men and having another vaccinated group inhale through their noses influenza B virus.

Increased resistance to each of these viruses was achieved by the mixed vaccine, the studies showed.

The influenza A outbreak during the winter of 1943-1944 gave an opportunity to test the vaccine on a larger scale and during a real epidemic. As reported in March by the Army's Commission on Influenza to the *Journal of the American Medical Association* (See

SNL, April 8) vaccination shortly before or even after the onset of the epidemic did give protection. The trial of the vaccine was made on 12,500 men in Army Specialized Training Program units. Influenza attacked 2.2% of the vaccinated and 7.11% of the non-vaccinated controls.

The logical assumption is that the vaccine will be equally effective in protecting against any future outbreak of influenza Type B, since it was effective against both B and A types in the Ypsilanti trials.

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ASTRONOMY

Jan. 25 Eclipse Photos Arrive at Harvard

See Front Cover

► **PICTURES** of the Jan. 25 eclipse of the sun, observed in Chiclayo, Peru, by the Mexican Eclipse Expedition, have just been received at the Harvard Observatory. (See *SNL*, Dec. 25, 1943, and April 29)

The 30-second exposure picture on the cover of this *SCIENCE NEWS LETTER*, showing the polar feathers, or aigrettes, at the time of total eclipse, was taken with an 8-meter camera.

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HORTICULTURE

"Gas Mask" for Apples Now Being Developed

► **EQUIVALENT** of a gas mask for prime apples during the storage period to combat the ill effects of the saboteurs of the apple crop, the ripener apples that give off ethylene gas, is being developed by the Agriculture Experiment Station of Cornell University.

As in soldiers' gas masks, the contaminated air in the storage bin is filtered through activated charcoal, with a little bromine added. During this process, the ethylene gas is absorbed and the air left purified.

Separate compartments in the storage bin would not solve the problem of protecting the apples, as any crop of apples may contain a few fruits riper than the rest. As few as 1% of the ripe specimens will speed the aging of the harder apples stored with them, Prof. R. M. Smock of the experiment station explained.

Science News Letter, May 13, 1944

HORTICULTURE

New Cantaloupe Variety Is Resistant to Mildew

► **TEXAS** cantaloupes, due to reach the market before long, should become more abundant from now on, because a new variety has been developed that is resistant to both aphids and downy mildew, worst insect enemy and worst fungus pest of cantaloupe vines everywhere. Breeding work on the new variety was done by Dr. S. S. Ivanoff of the Texas Agricultural Experiment Station. (*Journal of Heredity*)

Breeding stocks were selected from four varieties of West Indian origin, all of which had shown good resistance to aphids and mildew under South Texas conditions. Good size and shape for market requirements, ability to stand up under shipping conditions, and desirable qualities of sweetness and flavor were developed during the breeding program.

Science News Letter, May 13, 1944

PHOTOGRAPHY

Photoflash Lamps Okay For High-Speed Movies

► **PHOTOFLASH** lamps are satisfactory for the illumination of films taken with high-speed motion picture cameras on continuous moving film at the rate of upward of 2,000 frames per second, Henry M. Lester of New York City reported at the meeting in the same city of the Society of Motion Picture Engineers. He accompanied his description of the methods employed with motion pictures and demonstrations.

High-speed cameras are now in use he said, that produce exposures of from 1/10,000 to 1/30,000 second. Such brief exposures call for illumination of great intensity and high color temperature.

Incandescent lamps capable of providing such illumination, especially when operated at voltages higher than their respective rating, have many disadvantages, he stated. Among them are great power requirements, heavy conductors and the development of considerable heat.

"Operating on the current of a 6-volt dry cell (Hot Shot) battery one or more photoflash lamps will provide ample light of high color temperature of easily controllable duration," he continued. "Successive flashing of any number of photoflash lamps is accomplished with a Flash Distributor of a simple design."

Science News Letter, May 13, 1944

MILITARY SCIENCE

Preview of Armageddon

Group of representative writers, on long tour of Southeastern camps and airfields, view Army displays of weapons and tactics that will smash the Axis.

By DR. FRANK THONE

▶ RECENTLY a group of newspaper and magazine writers took off from the National Airport in Washington, D. C., in four Army transport planes. One week later they landed there again, a company of very tired men. They had spent the seven days among camps and airfields in the Southeastern states, in a strenuous program of seeing what the Army has and what the Army can do—the weapons and tactics that will be used in Europe this summer and against the Japs, until American, British and Chinese troops march together through the ruins of Tokyo.

These men had been invited to a preview of Armageddon, as the eyes and ears of the American public. They have reported in part already. More will follow. It is impossible to pour out at one sitting all that was packed in during that week of concentrated information-getting. In limited space, only a few highlights can be set forth.

One thing that could not fail to impress was the scientific exactness with which our forces go about the business of smashing the Axis. Take, as a first random sample, the job of the Field Artillery. It has become an application of precision chemistry.

Precision Time Firing

On one hillside in Louisiana, tanks and carrier-borne infantry had been assigned the task of capturing an assumed enemy position, while battalions of 105-millimeter howitzers gave cover to their advance.

After firing for a time with impact and delay-action shell, which get bursts close to the ground or slightly above it, the artillery went into the type of fire that involves the greatest technical difficulty and hence demands greatest skill—time fire. This involves setting a powder-train fuse in the nose of each shell so that it will burst at an exact hundredth-of-a-second before it touches the ground.

This demands not only great skill on

the part of the cannoneer who operates the fuse-setting mechanism, but has to take for granted absolute uniformity in the burning rate of the powder train.

Here is where the chemistry comes in. If the powder had been of the slightly irregular composition that had to be tolerated in 1918, simply because nothing better could be had then, the height of burst of the shells would have been uneven, and more of the enemy, lying doggo in slit trenches and fox holes, would have survived to jump up and fight when the tanks and infantry came up and closed with them. As it was, all bursts were exactly where the battery commanders wanted them, just about treetop height. This sends down whir-

ring, deadly splinters of hot steel, striking obliquely into dug-in shelters.

One feature of coordination between artillery and advancing attack forces was disclosed, when it was explained that the shells would continue with this deadly time fire even when the tanks were breaking into the enemy area, and the fragments were ringing down on their metal backs like the proverbial hail on a tin roof. With the tanks well buttoned up, their crews were safe enough, while the enemy troops, in the open, would be catching literal hell.

Attack With Flame

Flame, oldest of man's weapons and still one of the most terrible, was shown. Two of the fastest of fighter planes, that take a turn at being light bombers on occasion, tore at almost grass-skimming low altitude across the Florida scrub. Above the ground targets they let go the streamlined (Turn to page 316)



FLAME IS A DREADFUL WEAPON—Japs are said to have a special dread of American flame-weapons—burning oil and searing fragments of white phosphorus. Here in this Signal Corps picture is shown a phosphorus-bomb attack on the oft-battered Jap Lakunai airfield at Rabaul. At the end of each of those soft-looking streamers of white smoke is a bit of chemical hellfire. The importance of flame-weapons has increased so that supplying incendiary material now constitutes more than 50% of the work of the Chemical Warfare Service.



Research gives TELEVISION new horizons

● **TELEVISION RAYS**—like human sight—do not “bend” far beyond the curvature of the earth. They travel in a straight line to the horizon—and from the horizon off into space. In preparing television as a service to the public, research has sought ways to extend television’s program service by radio relaying from city to city.

A solution to this problem has been perfected by RCA engineers: the radio relay station—capable of picking up and automatically “bouncing” tele-

vision images from station to station. With such relays supplementing a coaxial cable, entertainment, sports and news events could be witnessed simultaneously by Americans from coast to coast.

Today, RCA’s research facilities are devoted to providing the Allied fighting forces with the most efficient radio and electronic equipment available. Tomorrow, these same skills and energies will continue to serve America in developing and creating new and finer peacetime products.



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Do You Know?

Lanolin used in cosmetics is refined wool grease.

Peanuts yield more oil per acre than cottonseed.

Wisconsin and Minnesota run a neck-and-neck race for honor as the "hay-makingest" state.

The adult clothes moth lives only a few weeks, but during that time lays from 100 to 300 eggs.

One-eleventh of the total amount of food grown in the United States last year came from Victory Gardens.

Old females—not males—are usually the leaders among all herds of African antelopes; the females also stand guard when a herd is resting or feeding.

When the war is over camouflage in reverse will be used to make factory and other roofs conspicuous and attractive to the airplane-travelling public.

Sunflower seed, now one of Argentina's principal crops, will yield some 1,200,000 tons this year, which will produce a large surplus of edible oil for export.

Wheat cereal is reported used in Mexico in a sand-blasting machine to clean airplane engine parts; the starch is removed by boiling and the residue ground with steel cutters which leave sharp corners on the particles.

During 1943, in industries in the United States, 18,400 workers were killed, 1,700 totally and permanently disabled, 108,000 permanently crippled, and 2,225,000 others temporarily laid up an average of 15 days each.

The population of Russia was reported as about 170,000,000 in 1939, an increase of 55% since 1900 in spite of wars and revolutions; it may reach 250,000,000 by 1970, according to a new study of the League of Nations.

Nearly 5,000 workers from the Bahama islands helped on American farms in 12 states last year; about three-fourths of them remained for winter work on Florida truck farms, and additional workers are now arriving.

From Page 314

belly tanks in which they ordinarily carry extra gasoline for long-range missions. As they struck the ground, a patch of red flame, about as long as a small cargo ship or a big warehouse, leaped up to treetop height, and burned away furiously for several minutes.

This particular flame weapon represents an improvisation that has been turned into a regular means of attack. At first, pilots would simply jettison their detachable belly tanks on any target that seemed worth the attention, then circle round and ignite it with incendiary bullets or small-caliber cannon shell. Now, each tank carries a detonator to ignite it, making the return trip unnecessary.

Another new trick with flame was demonstrated that would have earned an approving nod from Callinicus, who used Greek fire to stop the Moslems at the walls of Byzantium. One form of fuel used in flame-throwers now includes some kind of solid incendiary particles, which make denser snowflakes of fire within the general sheet of flame. These persist in their burning after the rest of the flame has gone out.

Still another fire-weapon, repeatedly demonstrated, has been white phosphorus. This is used in artillery shells, airplane bombs, mortar missiles and hand grenades. The bursting charge is not very large, so that fragments of the flaming stuff fall in an arcing shower, dropping vertically into slit trenches and foxholes. A man with a phosphorus burn in his flesh is as thoroughly disabled as if he had been hit with a shell fragment.

With Breath of Evil

Tales of birds with breath of evil that slew men by merely flying over them would be dismissed nowadays as fables belonging to the Arabian Nights. Added stories of cloaks that can protect against the peril would only increase the feeling of fantasy.

Yet this is one thing that the touring group of writers saw with twentieth century eyes when a plane roared low over a body of troops on a roadside. From the rear of the plane issued a cloud of brown mist that settled quickly towards the ground.

Each of the soldiers did what looked like a brief dervish dance. At the end of about five seconds they all stopped abruptly, crouching partly down to the ground.

Closer inspection showed that each



FOILS BLISTER-MAKERS—Every American soldier in the fighting zones carries, along with his gas mask, two of these covers, which are built exactly like enormous waxed-paper envelopes with transparent ends to see through. A properly trained man can whip his envelope out, expand it, and cover himself with it in five seconds.

man had whipped out of his gas-mask carrier a kind of personal envelope, spread it open with two swift swings of his arms, and then slipped it over himself. The top part consisted of transparent plastic sheeting and the rest of the garment of an impervious brown paper. Having served its purpose in warding off one cloud of blister-gas spray the whole thing is cast aside. It is cheap and easily replaced.

While crouching under the shelter of this protecting envelope the soldier adjusts his gas mask.

Of course the spray used in the demonstration was not mustard gas or any of the war blisters. It was just a convincing-looking imitation. But the protection would have worked as well had the game been "for keeps."

Science News Letter, May 13, 1944

ENGINEERING

"Dream" Refrigerator Has Almost Everything

➤ ONE OF THOSE "dream" gadgets for the post-war household seems to be embodied in patent 2,347,985, granted to C. G. Beersman of Evanston, Ill., It has just about everything. The door is

touch-controlled, the food compartment is circular and the height-adjustable shelves rotate, and the ice-cube compartment has trays with cam-lifting devices for easier removal. If anything liquid is spilled, it doesn't make a mess on

the bottom, but runs into a gutter and is drained off. There is a capacious vegetable-storage bin. About the only thing it doesn't do is go out and do its own shopping.

Science News Letter, May 13, 1944

AGRICULTURE

German Food Situation

Due to change for the worse this year because of shortages of manpower, fertilizers and other factors, U. S. Department of Agriculture official states.

► THE GERMAN FOOD situation may change for the worse soon because of shortages in manpower, fertilizers and other production factors. Production in 1944 may be considerably below that of the preceding years, and the 1945 food supply will probably be drastically curtailed.

This is the opinion of Dr. J. H. Richter of the Office of Foreign Agricultural Relations, U. S. Department of Agriculture, expressed in the official publication, entitled *Foreign Agriculture*. Germany's production and consumption of food thus far in this war have been at a level far above those of 1914-18, he says.

"In contrast to the situation in 1914, Germany's food economy in 1939 was well prepared for war," he declared. "Following a period of sustained expansion, agricultural production had reached a high level. Over 85% of the nation's food supply was produced from domestic resources, the only substantial deficit being in fats and oils. From 1937 until the outbreak of war, stocks of grain, fats and sugar had been accumulated in considerable quantities."

In the years just prior to World War

I, German livestock was dependent upon the importation of feed to the extent of about 38% of the total output of livestock products. In 1939 the dependence on imported feeds was not more than 10% with the result that livestock production has been considerably less affected in the past four years than during the 1914-18 period.

An important factor in the high level of farm production was the relatively large supply, up to 1943, of commercial fertilizers other than phosphates. Especially important was the availability of nitrogen in quantities six or seven times as great as in the previous war.

"This excess, even after allowance has been made for the drastic reduction in phosphates, may still be estimated as accounting for an annual crop production of over 6,000,000 tons in terms of grain," Dr. Richter states.

In his opinion, Germany's own production has remained the backbone of its wartime food supply, despite the importation of substantial quantities requisitioned in other parts of continental Europe under German control.

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High Visibility Yellow was suggested for trucks, hoists, steps, edges, and railings; Safety Green for first aid rooms, stretchers and locations of medical equipment; and Traffic White, Gray or Black were offered for setting of traffic lanes, aisles, storage areas and corners.

For the benefit of the 4% of the population who are color-blind, Mr. Denning urged use of safety symbols in connection with safety colors—triangles or arrow with orange, cross with green, square with red, and disk with blue.

Science News Letter, May 13, 1944

Safer Future Promised

► A SHINING and safer future, with materials visible in the dark, was predicted by Dr. G. F. A. Stutz, of the New Jersey Zinc Company.

Fluorescent pigments visible in ultraviolet light and phosphorescent materials that glow in the dark, he said, serve many war uses and will illuminate the post-war road to safety.

Aviators in planes forced down at sea release fluorescent dye powders that tint a large area of water, making it visible to rescue planes, and dyed panels of silk are used by ground troops to signal planes.

Fluorescent pigments are being used in plastics, paper, paints, printing inks, and powders, and in coatings for instrument boards and panels of ships, planes, and control rooms where darkness is desirable but visibility must be maintained.

A fluorescent plastic envelope, activated by ultraviolet light, permits read-

SAFETY

Reducing Accidents

► A RAINBOW of industrial colors to protect war workers, with high spots picked out as Alert Orange, Precaution Blue, and High Visibility Yellow, is the home-front safety scheme advanced by Matt Denning, of E. I. du Pont de Nemours and Company, before the 15th Annual Convention of the Greater New York Safety Council.

In line with the Safety Council's foremost objective—"to reduce accidents in our homes, on our streets, in our industries and elsewhere"—new spring safety colors were exhibited that add

"three-dimensional seeing" to safety precautions, on the theory that the human eye quickly recognizes colors and the brain learns to associate colors with certain equipment.

Alert Orange, a "loud shouting color," was recommended for application to such industrial danger spots as electrical switch boxes, machinery guards, pulleys and gears. Fire protection equipment and locations were to be designated by a "noisy" red, while Precaution Blue was to identify equipment not to be used, moved or started.

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ing of maps, papers and messages in a blackout. Fluorescent-dyed paper sounds the death-knell for counterfeiting, and fluorescent inks are the modern answer to the problem of marking laundry invisibly.

Phosphorescent materials that glow in the dark are insurance against barked

shins and frayed tempers for nocturnal navigation of bedroom and bathroom, Dr. Stutz stated.

Vitreous enamels treated with phosphorescent pigments, and activated by daylight, maintain an afterglow which assures visibility.

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PHYSIOLOGY

Frog Hearts Transplanted

Soviet scientist tells how he replaces the heart of a frog with that from another frog. Some of his animals live normally for 100 days afterwards.

► THE FEAT of replacing an animal's heart by the heart of another animal through a transplantation operation has been accomplished by Prof. N. P. Sinitsin, of the Gorky Medical Institute in Moscow.

The animals whose hearts were transplanted were all frogs. Some have lived four months, apparently in good health. Electrocardiograms show no difference in the muscle action of the transplanted hearts from that of frog hearts that have not been transplanted.

Frogs were chosen for the experiments because the heart of cold-blooded animals fits the conditions Prof. Sinitsin believes extremely important for solving the problems of successful transplantations of animal organs. Prof. Sinitsin, in a report written for the Soviet Scientists' Anti-Fascist Committee, describes his experiments as follows:

"Despite its great antiquity, the problem of transplantation of organs is still far from being solved. Of all the work done on this problem, that most deserving of attention was in cases in which the scientist dealt with tissues that are fed by liquids that wash over them. In other words the method of feeding approximates that of embryonic tissue.

"This is a factor which I consider to be of extreme importance in solving the problem of transplantation. The heart of cold-blooded animals is at the embryonic stage of development so far as its histological structure and feeding system are concerned. I based my experiments on these conceptions.

"I developed a method for rapidly sewing up blood vessels and my first series of experiments enabled me to place a second heart beside the animal's own heart. Observation showed that the transplanted heart worked well and that frogs with two hearts lived 30 days and sometimes more.

"A second series of experiments enabled me to cut out the heart of the animal and place the transplanted heart into the blood vessel system. In the first experiment this was done only temporarily but later the frog's heart was completely replaced by the transplanted heart.

"The transplanted heart functioned normally under the new conditions. Some of my animals lived over 100 days and did not show any differences in behavior from normal frogs. In the spring both males and females which had been operated on went through a normal nuptial period which ended with spawning.

"The third series of experiments carried out in the autumn and winter of 1943-1944 was the transplantation of the heart by a new method through the frog's mouth, the frog's own heart being removed at the same time and the transplanted heart immediately included in the blood vessel system.

"The operations were carried out under aseptic conditions with a minimum loss of blood and the smallest possible surgical injury of the tissue of the mouth so that it did not require stitching.

"Frogs operated in this third series do not behave in any way differently from unoperated frogs. Some have already lived 130 days. Electrocardiograms of the transplanted hearts coincide exactly with those of the unoperated hearts. Observations are being continued."

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Nine federal *detinning* plants in the United States are now salvaging metal from tin cans.

An acid or caustic soda treatment of southern *pine* increases turpentine and rosin output.



Neglected Beauties

► WHEN the first settlers in the Colonies found time enough to lay out flower gardens and develop tree-and-shrub settings for their houses, they brought over old familiar favorites already known in western Europe: roses and peonies, irises and tulips, pansies and pinks. Some of these were native to Europe, others had been brought in from Asia—in some instances as early as the Crusades or even the Roman Empire. At any rate, they had become thoroughly a part of the European scene, and European gardeners had made, and continued to make, many changes in color and size and other appeals to the eye.

After independence was achieved, and American ships began to ply in the China trade, we made quite a number of direct importations from eastern Asia, especially into the mild-climated Southeast—such things as camellias, chrysanthemums and (surprisingly enough) the Cherokee rose.

Some native flowers and shrubs have found their proper places in American gardens: rhododendron, azalea, flowering dogwood, gaillardia, several species of phlox, to name only a random few. But the ones we cultivate are a mere corporal's guard compared with the hosts of fine flowers we still neglect.

One of the pities of the situation, too, is the fact that many of these neglected native species are particularly well adapted for growing in the shade—that perennial problem of the home-grounds gardener. Think of the fine flowers you have seen growing in the woods, but seldom or never in the average suburban flower garden or shrubbery: trillium,

bellwort, dogtooth violet, anemone, lady's-slipper, a score or more of delicate little wild orchids. The list might be extended indefinitely—and all of them plants that tolerate or even demand at least partial shade.

This is not meant to be an exhortation to every home-grounds flower grower to hasten into the nearest woodland with trowel and basket, to uproot and transplant. That way murder lies. Most transplanted wildflowers soon sicken and die, unless the job has been done by an experienced hand. However, there are at least a few persons in the country who have been sufficiently interested in promoting our native species to go into the wildflower-reproducing business on at least a small scale. They are deserving of all flower-growers' patronage.

Science News Letter, May 13, 1944

PUBLIC HEALTH

Opportunities for Nurses In Post-War World

► THE NEED for nurses continues to increase. To meet this need, 65,000 must be added to the enrollment of accredited nursing schools by July of this year, according to a statement from the U. S. Office of Education. Even allowing for the number who may be drawn from colleges it will take about one out of every nine girls graduating from high school this spring to make up the total needed.

Many high school girls are doubtless convinced that their services will be needed if they finish training before the war is over, but they may be wondering what the post-war future will hold for them in the way of work and a livelihood if they enter nursing training now. They and their parents may feel that the sudden and large increase in the numbers now entering training may make nursing an overcrowded profession after the war.

"Partial answers, all of them reassuring, are to be found in the following considerations," says the statement from the Office of Education.

"The normally high rate of turn-over among nurses in peacetime, which has undoubtedly been materially checked during war, may logically be expected to reach a new high in the immediate post-war period. Many nurses who entered nursing, or who came out of retirement to patriotically serve the war effort, will drop out of nursing again as the period of emergency ends.

"Moreover, the conditions which have necessitated the wartime expansion of hospitals and public health facilities will tend to perpetuate the increased demand for nursing service beyond the war. The increase in group medical and hospital service will also tend to increase the opportunities for nursing."

In addition, such special fields as public health nursing and the various services in nursing education are expected to expand and call for more nurses than in the past.

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• Books Off the Press •

AIRPLANE ENGINE MECHANICS, Questions and Answers—Rolla Hubbard and Augustin Dilworth—McGraw-Hill, 260 p., illus., \$2.25.

AMERICAN PLANNING AND CIVIC ANNUAL—Harlean James, ed.—*Am. Planning & Civic Assoc.*, 195 p., illus., \$3. A record of recent civic advance in the fields of planning, parks, housing, neighborhood improvement and conservation of national resources.

ELEMENTS OF BIOLOGY: A Brief Course for College Students—Perry D. Strausbaugh and Bernal R. Weimer—Wiley, 461 p., illus., \$3.25.

FLORAL ANATOMY OF THE SANTALACEAE AND SOME RELATED FORMS—Frank H. Smith and Elizabeth C. Smith—*Oregon State College Press*, 93 p., illus., paper, 50c., Studies in Botany, No. 5.

THE GERMAN SOLDIER—Capt. Arthur Goodfriend—*Infantry Journal*, 97 p., illus., paper, 25c.

INDUSTRIAL OPHTHALMOLOGY—Hedwig S. Kuhn—Mosby, 294 p., illus., \$6.50.

INTRODUCTION TO MICROORGANISMS—LaVerne Ruth Thompson—W. B. Saunders, 445 p., illus., \$2.75.

MATHEMATICS FOR EXTERIOR BALLISTICS—Gilbert Ames Bliss—Wiley, 128 p., illus., \$2.

MIDDLE AMERICA—Charles Morrow Wilson—Norton, 317 p., illus., \$3.50.

MISSION MONUMENTS OF NEW MEXICO—Edgar L. Hewett and Reginald G. Fisher—*Univ. of New Mexico Press*, 269 p., illus., \$4.

ORGANIC REACTIONS, Vol. II—Roger Adams, ed.—Wiley, 461 p., \$4.50.

OUR AIR-AGE WORLD—Leonard O. Packard, Bruce Overton and Ben D. Wood—Macmillan, 838 p., illus., \$2.80. Parents as well as pupils will find great interest in this textbook on economic geography written from an ultra-modern viewpoint.

OUTWITTING OUR NERVES—Josephine A. Jackson and Helen M. Salisbury—*Garden City*, 420 p., \$1, 2nd ed. rev. and enl.

THE OXY-ACETYLENE HANDBOOK, A Manual on Oxy-Acetylene Welding and Cutting Procedures—Linde Air Products Co., 587 p., illus., \$1.50.

PROTECT YOURSELF, The Secret of Unarmed Defense—Brooks Mendell—*Essential Books*, 96 p., illus., \$2.75.

PSYCHOLOGICAL MEDICINE—Desmond Curran and Eric Guttman—Williams and Wilkins, 188 p., illus., \$3.50. A short introduction to psychiatry with an appendix on war-time psychiatry.

ROCKETS: The Future of Travel Beyond the Stratosphere—Willy Ley—*Viking Press*, 287 p., illus., \$3.50.

TARAWA, The Toughest Battle in Marine Corps History—Staff Sgt. Dick Hannah—Duell, Sloan & Pearce, 126 p., illus., paper, \$1. A U. S. Camera book.

10,000 GARDEN QUESTIONS ANSWERED BY 15 EXPERTS—F. F. Rockwell, ed.—*Am. Garden Guild, Inc. and Doubleday*, 1467 p., illus., \$3.95.

UNITED ANIMALS TOWN—Alfred Baker Lewis—*Island Press*, 28 p., illus., paper, \$1.

WINGS AFTER WAR, The Prospects of Post-war Aviation—S. Paul Johnston—Duell, Sloan and Pearce, 129 p., illus., \$2.

Science News Letter, May 13, 1944

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•New Machines and Gadgets•

❁ **KNOTLESS** shoelaces, recently patented, have the usual metal tips, but have a series of openings woven in the laces themselves near the tips. Each tip is inserted through an opening on the opposite end and drawn tightly. The lace holds firmly without tying.

Science News Letter, May 13, 1944

❁ **EMERGENCY** wheel brakes for motor vehicles, now patented, consist of a pair of curved metal pieces hinged to the car frame, the lower ends of which swing under the wheels when released by the emergency brake lever. When the wheels run on them, they become locked to the vehicle, and the car stops instantly.

Science News Letter, May 13, 1944

❁ **LIGHTWEIGHT** automobiles, refrigerators, railroad cars and other equipment may be made in post-war days of a new aluminum alloy of remarkable strength and toughness now reserved for aircraft. It is tough enough to replace armor plate, and so strong that thinner sheets may be used successfully in airplanes.

Science News Letter, May 13, 1944

❁ **MODIFIED RUBBER** recently developed, mixed in small quantities with large quantities of synthetic rubber, gives a material satisfactory for bullet-sealing gasoline and oil tanks in airplanes. The mixture has the necessary quality of cohesion or tackiness.

Science News Letter, May 13, 1944



❁ **LOCKING RING**, grooved inside and out, is used to hold a stud or threaded insert firmly in place in spite of airplane vibration or machinery shaking. The inside serrations, shown in the picture, engage similar serrations on the stud while the outside serrations fit in grooves in the surrounding metal.

Science News Letter, May 13, 1944

❁ **A SCOOTER** operated by a foot lever, now patented, is propelled by pumping with one foot while standing on its platform with the other. It has a simple pawl-and-rack power transmission, and saves rationed shoe leather.

Science News Letter, May 13, 1944

❁ **FIRE HOSE**, canvas and raincoats are now being made of a new cotton fiber which, when moistened, swells enough to block up the interstices in fabrics made from it. The cloth becomes water-resistant and water-repellent.

Science News Letter, May 13, 1944

❁ **A FLATIRON** mounted on the end of an arm over the ironing board in a newly patented device must be guided manually, but it is mechanically controlled for varying thicknesses of materials. It raises automatically from the material when the hand is removed from the guiding and pressure lever.

Science News Letter, May 13, 1944

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 207.

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